

Rec'd PCT/PTO 20 JUL 2004



PCT/GB 93 / 0 0 0 2 5 8



INVESTOR IN PEOPLE

The Patent Office
Concept House
Cardiff Road
Newport
South Wales
NP10 8QQ

10 MAR 2003

WIPO

PCT

**PRIORITY
DOCUMENT**
SUBMITTED OR TRANSMITTED IN
COMPLIANCE WITH RULE 17.1(a) OR (b)

I, the undersigned, being an officer duly authorised in accordance with Section 74(1) and (4) of the Deregulation & Contracting Out Act 1994, to sign and issue certificates on behalf of the Comptroller-General, hereby certify that annexed hereto is a true copy of the documents as originally filed in connection with the patent application identified therein.

In accordance with the Patents (Companies Re-registration) Rules 1982, if a company named in this certificate and any accompanying documents has re-registered under the Companies Act 1980 with the same name as that with which it was registered immediately before re-registration save for the substitution as, or inclusion as, the last part of the name of the words "public limited company" or their equivalents in Welsh, references to the name of the company in this certificate and any accompanying documents shall be treated as references to the name with which it is so re-registered.

In accordance with the rules, the words "public limited company" may be replaced by p.l.c., plc, P.L.C. or PLC.

Re-registration under the Companies Act does not constitute a new legal entity but merely subjects the company to certain additional company law rules.

Signed

Le Behen

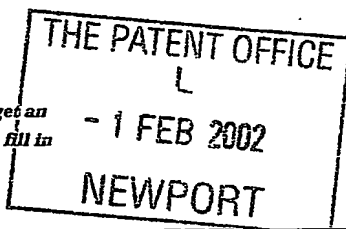
Dated

10 February 2003

BEST AVAILABLE COPY

Request for grant of a patent

(See the notes on the back of this form. You can also get an explanatory leaflet from the Patent Office to help you fill in this form)



The Patent Office

Cardiff Road
Newport
South Wales
NP9 1RH

1. Your reference

XA1604

0202299.4

1 FEB 2002

3. Full name, address and postcode of the or of each applicant (*underline all surnames*)

BAE SYSTEMS plc

6 Carlton Gardens
London
SW1Y 5AD

Patents ADP number (*if you know it*)

If the applicant is a corporate body, give the country/state of its incorporation

United Kingdom

7914674004

4. Title of the invention

LIGHT COVER

5. Name of your agent (*if you have one*)

"Address for service" in the United Kingdom to which all correspondence should be sent (*including the postcode*)

BAE SYSTEMS plc
Group IP Department
Lancaster House, P.O. Box 87
Farnborough Aerospace Centre
Farnborough, Hampshire, GU14 6YU

Patents ADP number (*if you know it*)

07914674002

6. If you are declaring priority from one or more earlier patent applications, give the country and the date of filing of the or of each of these earlier applications and (*if you know it*) the or each application number

Country

Priority application number
(*if you know it*)

Date of filing
(*day / month / year*)

7. If this application is divided or otherwise derived from an earlier UK application, give the number and the filing date of the earlier application

Number of earlier application

Date of filing
(*day / month / year*)

8. Is a statement of inventorship and of right to grant of a patent required in support of this request? (*Answer 'Yes' if:*

YES

- a) any applicant named in part 3 is not an inventor, or
 - b) there is an inventor who is not named as an applicant, or
 - c) any named applicant is a corporate body.
- See note (d))

Patents Form 1/77

7. Enter the number of sheets for any of the following items you are filing with this form. Do not count copies of the same document

Continuation sheets of this form

Description 05

Claim(s) 01

Abstract 01

Drawing(s) 02 + 2

10. If you are also filing any of the following, state how many against each item.

Priority documents

Translations of priority documents

Statement of inventorship and right to grant of a patent (Patents Form 7/77)

Request for preliminary examination and search (Patents Form 9/77) 1 ✓

Request for substantive examination (Patents Form 10/77)

Any other documents (please specify)

11.

I/We request the grant of a patent on the basis of this application.

Signature

R.M. Edis

Date

R.M. Edis

31/01/2002

12. Name and daytime telephone number of person to contact in the United Kingdom

Maria Burkes 01252 383487

Warning

After an application for a patent has been filed, the Comptroller of the Patent Office will consider whether publication or communication of the invention should be prohibited or restricted under Section 22 of the Patents Act 1977. You will be informed if it is necessary to prohibit or restrict your invention in this way. Furthermore, if you live in the United Kingdom, Section 23 of the Patents Act 1977 stops you from applying for a patent abroad without first getting written permission from the Patent Office unless an application has been filed at least 6 weeks beforehand in the United Kingdom for a patent for the same invention and either no direction prohibiting publication or communication has been given, or any such direction has been revoked.

Notes

- a) If you need help to fill in this form or you have any questions, please contact the Patent Office on 0645 500505.
- b) Write your answers in capital letters using black ink or you may type them.
- c) If there is not enough space for all the relevant details on any part of this form, please continue on a separate sheet of paper and write "see continuation sheet" in the relevant part(s). Any continuation sheet should be attached to this form.
- d) If you have answered 'Yes' Patents Form 7/77 will need to be filed.
- e) Once you have filled in the form you must remember to sign and date it.
- f) For details of the fee and ways to pay please contact the Patent Office.

- 1 -

LIGHT COVER

The present invention relates to a light cover arranged to be placed over a light source, and in particular a light cover in combination with a reflective
5 element.

It is common practice within the transport industry to place transparent covers over exterior light sources on moving vehicles or aircraft. As well as protecting the light sources from damage, such as from being hit by small stones or debris that may strike the moving vehicle from time to time, the covers
10 allow good aerodynamic profiles to be achieved.

Within the aircraft industry, all exterior lights, such as navigation and landing lights, are required by safety legislation to have such covers. In particular, for aircraft landing lights the safety regulations stipulate that in the event that the light cover for the landing light is broken or cracked then the
15 aircraft must not fly until the cover has been replaced.

This can prove problematic to both the aircraft operator and the aircraft manufacturer. It is clearly detrimental to the aircraft operator because of the direct cost of replacing landing light covers on a frequent basis, together with the indirect costs incurred due to the aircraft being temporarily out of service.
20 Furthermore, in order to provide protection against the possibility of difficulties in sourcing or manufacturing sufficient quantities of light covers to satisfy the aircraft operators demand, for example because of industrial action, the aircraft manufacturer may need to hold large numbers of covers in stock, to the detriment of their cash flow.

At present this potential problem of second sourcing is exacerbated because the light covers are made of glass. Although glass has excellent optical qualities, the complex shapes often required for the light covers, due to the need to present a smooth aerodynamic surface, can be expensive to manufacture. Furthermore, glass is known to be a relatively brittle and inflexible
30 material that can be broken by the stresses and strains that are inevitably transmitted to the light cover due to the flexing of the various aircraft surfaces

even though strain relief is provided for the covers. Although transparent plastic materials are known that could be manufactured to the required shape and have the necessary strength and flexibility to withstand such stresses and strains without cracking or breaking, they have hitherto remained unused
5 because they melt under the heat of the landing light bulb, the bulbs being typically 600 watts. It will, of course, be appreciated that the space available within an aircraft is restricted and hence the bulbs are relatively close to the cover. For example, a polycarbonate light cover for a 600 watt landing light bulb would melt in approximately 10 minutes. Although this would be
10 permittable for emergency use, it is clearly not a viable proposition as a permanent solution.

According to a first aspect of the present invention there is provided a light cover arranged to be placed over a light source, the light source further emitting infrared radiation when in use, wherein the light cover includes a
15 reflective element arranged to reflect a portion of the emitted infrared radiation away from the light cover.

Preferably the reflective element comprises an infrared reject filter. Preferably the reflective element is partially mirrored.

Preferably the light cover is manufactured from a synthetic material, such
20 as a polycarbonate plastic. Preferably the light cover is coated with a scratch resistant layer such as Perspex (registered trade mark).

Preferably, said reflective element is further arranged to reflect said infrared radiation away from said light source.

Preferably the light cover is an aircraft exterior light cover.

25 According to a second aspect of the present invention there is provided a light assembly comprising a light source mounted within a housing, the light source emitting infrared radiation when in use, a light cover placed over said light source and a reflective element located between said light source and said light cover and arranged to reflect a portion of the emitted infrared radiation
30 away from the light cover.

- 3 -

It is therefore possible to provide a light cover that is both strong and flexible enough so as to not be prone to cracking or breaking, and is capable of withstanding the heat generated from the light bulb.

An embodiment of the present invention is described, by way of example only, with reference to the accompanying figures, of which:

Figure 1 is a perspective view of a light cover according to an embodiment of the present invention; and

Figure 2 is a schematic representation of a light assembly including the light cover shown in Figure 1.

Figure 1 shows a perspective view of a light cover according to an embodiment of the present invention. The cover comprises a transparent element 2 that is substantially the size and shape of the required light cover. Transparent element 2 has a shaped periphery (not visible in Figure 1) that is fastened between an outer mounting ring 4 and an inner fastening ring 6. The inner fastening ring 6 is secured to the outer mounting ring 4 using a number of screws or bolts 8, thus securely fastening the transparent element 2 between it and the outer mounting ring 4. The shaped periphery of the transparent element 2 is such that a smooth aerodynamic profile is presented by the exterior surface of the light cover.

Mounted on the inner fastening ring 6 are two filter support brackets 10. Attached to the filter support brackets 10 so as to span across a portion of the transparent element 2, is an infrared reject filter 12. Such filters are commercially available. The infrared filter 12, due to the configuration of the filter mounting brackets 10, is inclined to the surface of the transparent element 2.

Figure 2 schematically illustrates the positioning and operation of a light assembly 14 incorporating a light cover as shown in Figure 1. The light assembly 14 comprises a light source 16 mounted within a housing 18 and covered by a light cover, only the transparent element 2 of which is shown in Figure 2 for clarity. The light assembly 14 is typically mounted within the wing and/or fuselage 20 of an aircraft.

The transparent element 2 of the light cover is preferably manufactured from polycarbonate, although other suitable synthetic materials may be used. Polycarbonate is a strong, transparent thermosetting plastic that can be moulded and/or machined to the complex shape required for the light cover, yet is flexible enough to withstand the stresses and strains transferred to the light cover from the wing and/or fuselage. As polycarbonate is extremely difficult to polish, and the exterior surface of the light cover is prone to being scratched due to dust abrasion, it is preferred that the exterior surface of the transparent element 2 is coated in Perspex (registered trade mark) or the like. Perspex is more easily polished, allowing the majority of the scratches to be polished out, thus extending the life of the light cover.

Referring back to Figure 2, the arrow 22 represents a light ray from the light source 16. The light ray passes through the infrared filter 12 and the transparent element 2 to illuminate an area in front of the light assembly 14. The light source 16, which may typically be a 600 watt bulb, also emits a substantial amount of heat as infrared radiation. The infrared filter 12, which may be coated so as to render the filter 12 partially mirrored, reflects a substantial proportion of the infrared radiation, indicated by the chain arrow 24, towards the rear of the housing 18. Without the presence of the infrared filter 12, the heat emitted from the light source 16 would be sufficient to melt the polycarbonate transparent element 2 in approximately 10 minutes.

The angle of the infrared filter 12, indicated by angle A, is carefully selected to direct the reflected infrared radiation towards a non-critical part of the lighting housing 18 so as to avoid unwanted heating of a heat sensitive part of the assembly. It is important that the infrared radiation is not directed substantially back towards the light source 16, as this would cause the light source itself to overheat and fail. It will be appreciated that the infrared filter 12 may alternatively be secured to the housing 18 by suitable means whilst still reflecting infrared radiation away from the transparent element 2.

The present invention therefore provides a light cover incorporating or associated with a heat reflector that, with careful selection of the angle of the heat reflector, directs heat away from both the light cover itself and the light

- 5 -

source. This allows plastics which have hitherto been precluded from use due to thermal problems to be used.

CLAIMS

1. A light cover arranged to be placed over a light source, the light source further emitting infrared radiation when in use, wherein the light cover includes a reflective element arranged to reflect a portion of said emitted infrared radiation away from said light cover.
2. A light cover according to claim 1, wherein said reflective element comprises an infrared reject filter.
3. A light cover according to claim 1 or 2, wherein said reflective element is partially mirrored.
4. A light cover according to any preceding claim wherein said light cover is manufactured from a synthetic material.
5. A light cover according to claim 4, wherein said synthetic material is polycarbonate.
6. A light cover according to claim 4 or 5, wherein said light cover is coated with a scratch resistant layer.
7. A light cover according to any preceding claim, wherein said reflective element is further arranged to reflect said infrared radiation away from said light source.
8. A light cover according to any preceding claim, wherein said light cover comprises an aircraft exterior light cover.
9. A light assembly comprising a light source mounted within a housing, the light source emitting infrared radiation when in use, a light cover placed over said light source and a reflective element located between said light source and said light cover and arranged to reflect a portion of the emitted infrared radiation away from the light cover.

- 7 -

ABSTRACT**LIGHT COVER**

5 A light cover has a transparent element 2 manufactured from polycarbonate and an infrared filter 12 angled so as to reflect infrared radiation emitted from a light source 16 away from both the transparent element 2 and the light source 16.

(Figure 1)

10

1/2

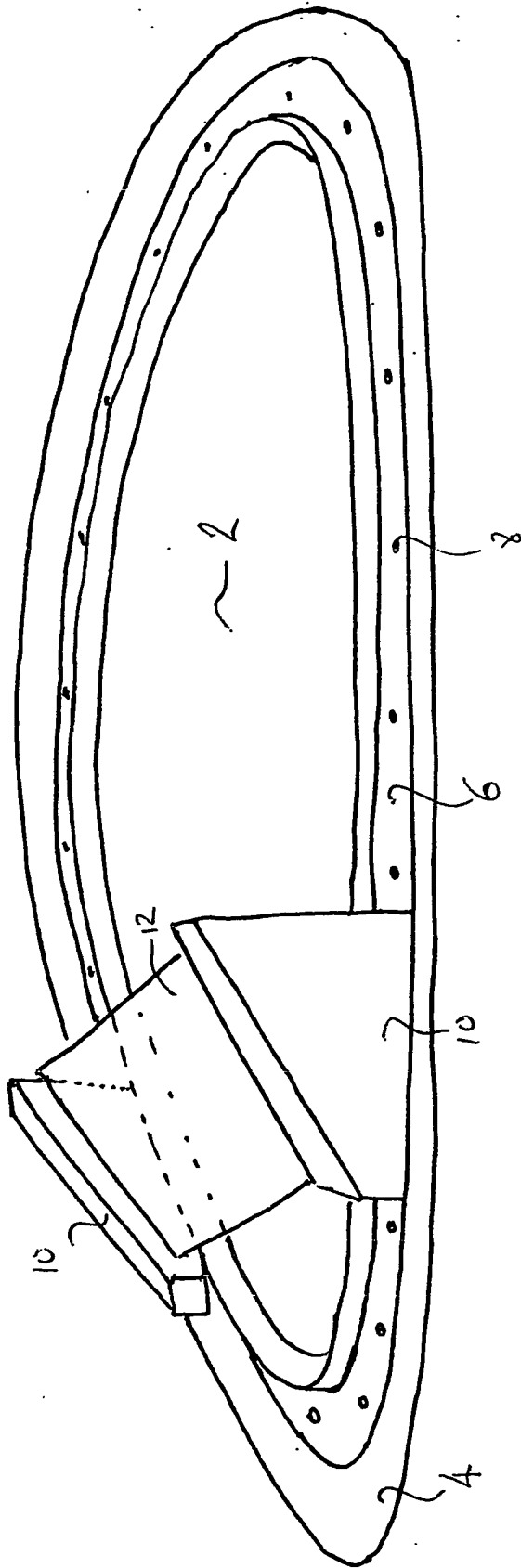


FIGURE 1

2/2

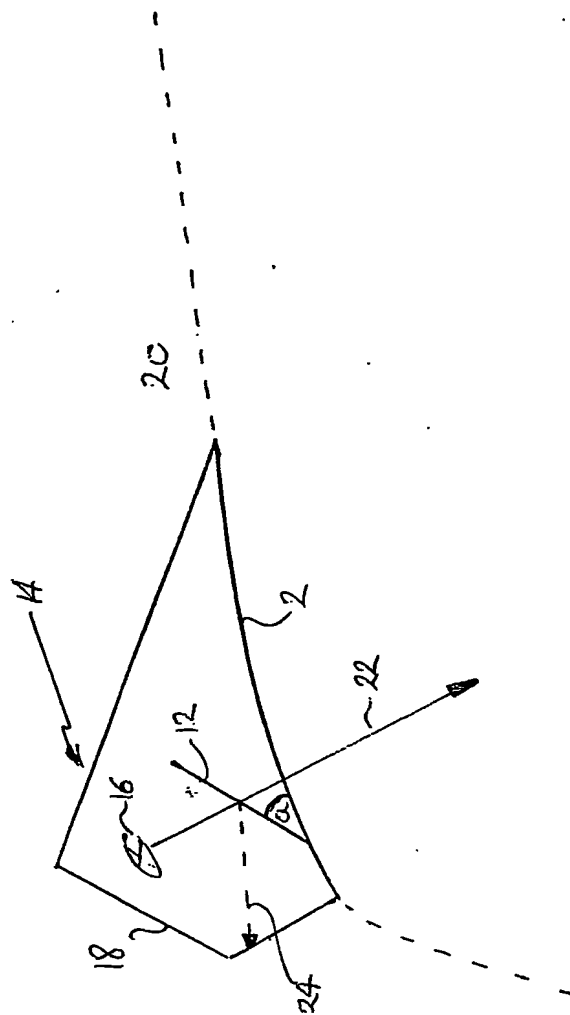


FIGURE 2